

**REMARKS**

The Applicant has received and reviewed the Office Action dated February 23, 2007 wherein the Office rejected Applicant's claims 1, 2, 4, 5, 13, 14, 19, 20, 22, 23, and 30 under 35 U.S.C. 102(b) as being anticipated by the newly cited reference of Lizama et al (US Patent No. 5,458,752) and Applicant's claims 8-12, 16, 17, 24-26 and 32 under 35 U.S.C. 103(a) as being unpatentable over the combination of the references of Lizama et al and Bayley et al (British Patent 1,443,704).

The Office however indicated that Applicant's claims 3, 6, 15, 28-30, 33, and 34 contained allowable subject matter. It is noted that the Office rejected Applicant's claim 30 under 35 U.S.C. 102(b) while also indicated that Applicant's claim 30 contains allowable subject matter.

**Examiner's interview of June 7, 2007**

Applicant's attorneys Carl L. Johnson, Thomas N. Phung, and inventor Dr. Mathews J. Thundyil thank Examiner Drodge for the courtesy and time in granting the telephone interview on June 7, 2007 to discuss the claims and the cited art.

During the interview, it was agreed that if the Applicant amended the independent claims by inserting the limitations supported in the last paragraph of page 8 of the Applicant's specification regarding the introduction of the extraction liquid "by mixing, pressuring or agitating" to form a physical emulsion "and to form" ... extraction liquid droplets under 10

micron in diameter ... that the amendment would distinguish the Applicant's claims over the prior art now of record.

In response to the above, the Applicant has amended independent claims 1, 13, and 30 to include the above limitations in each of the claims.

**Rejection under 35 U.S.C. 102(b) to Lizama et al.**

Applicant's claims 1, 2, 4, 5, 13, 14, 19, 20, 22, 23, and 30 stand rejected under 35 U.S.C. 102(b) as being anticipated by the newly cited reference of Lizama et al (US Patent No. 5,458,752). The Applicant respectfully submits that Applicant's claims 1, 2, 4, 5, 13, 14, 19, 20, 22, 23, and 30 are allowable over the reference of Lizama et al. for the following reasons.

**A. The reference of Lizama et al. does not teach mixing, pressurizing, or agitating to form a physical emulsion or capturing the microdispersed droplets with the use of a porous medium**

In regards to Applicant's independent claims 1, 13 and 30, per the agreement during the Examiner's interview of June 7, 2007, the Applicant has amended independent claim 1 to now call for a process for the extraction of an unwanted liquid from a fluid that includes the step of:

“...introducing an immiscible extraction liquid into a fluid having an unwanted liquid therein by mixing, pressurizing, or agitating to form a physical emulsion to form a plurality of extraction liquid droplets under 10 micron in diameter suspended in the fluid;...” (Emphasis added.)

Applicant's independent claim 13 has been amended to now call for a process for the extraction of an acid from a fluid comprising the steps of:

“...mixing, pressurizing, or agitating to form a stable physical emulsion to form a plurality of polar liquid droplets under 10 micron in diameter dispersed through out the fluid, said polar liquid droplets attractable to the acid in the fluid through a polar interaction to form a plurality of polar liquid acid droplets;... (Emphasis added.)

Applicant's independent claim 30 has been amended to now call for a process for the extraction of an unwanted liquid from a fluid that includes the step of:

“...introducing an immiscible extraction liquid into a fluid having an unwanted liquid therein by mixing, pressurizing, or agitating to form a physical emulsion to form a plurality of extraction liquid droplets under 10 micron in diameter suspended in the fluid;... (Emphasis added.)

Support for the above amendment to independent claims 1, 13, and 30 can be found for example on page 8, lines 15-22; page 9, lines 12-20; and page 13, lines 1-14 of the Applicant's disclosure. The Applicant respectfully submits that the reference of Lizama et al. does not teach the step of mixing, pressurizing, or agitating to form a stable physical emulsion to form a plurality of polar liquid droplets under 10 micron in diameter dispersed through out the fluid as called for in Applicant's amendment to independent claims 1, 13 and 30. The reference of Lizama et al. instead teaches the use of an “electrical field” to “... atomize and disperse the aqueous phase into the organic phase.” (See column 4, lines 39-41, and lines 53-63 of Lizama et al.)

It is respectfully submitted that Lizama et al.'s use of an “electrical field” is different from the Applicant's step of mechanically dispersing (such as by mixing, pressurizing, or agitating) the volume of polar liquid or the immiscible extraction liquid to form a stable physical emulsion

as the Applicant's aforementioned steps comprises a non-electrical method of dispersal of a liquid in forming a stable physical emulsion.

It is for the above reasons and per the agreement during the Examiner's interview of June 7, 2007 that the Applicant respectfully submits that Applicant's independent claims 1, 13 and 30, as amended, are allowable over the reference of Lizama et al.

**B. The reference of Lizama et al does not teach providing a specific gravity difference of as low as 0.01 between the larger droplets and the fluid**

Applicant's claims 1, 2, 4, 5, 13, 14, 19, 20, 22, 23, and 30 stand rejected under 35 U.S.C. 102(b) as being anticipated by the reference of Lizama et al (US Patent No. 5,458,752). In regards to Applicant's independent claims 1, 13 and 30, Applicant's independent claim 1 calls for a process for the extraction of an unwanted liquid from a fluid that includes the step of:

“...controlling a volume of the immiscible extraction liquid introduced into the fluid such that there is a specific gravity difference of as low as 0.01 between the larger droplets containing the unwanted liquid and the fluid;...” (Emphasis added.)

Applicant's independent claim 13 calls for a process for the extraction of an acid from a fluid that includes the step of:

“...controlling an amount of water added to the fluid such that there is a specific gravity difference of as low as 0.01 between the plurality of larger droplets containing the acid and the fluid;...” (Emphasis added.)

Applicant's independent claims 30 calls for a process for the extraction of an unwanted liquid from a fluid that includes the step of:

“...controlling an amount of immiscible extraction liquid introduced into the fluid such that there is a specific gravity difference of as low as 0.01 between the larger droplets and the fluid;...”(Emphasis added.)

The Applicant respectfully submits that the reference of Lizama et al does not teach the feature of providing a specific gravity difference of as low as 0.01 between the larger droplets and the fluid as called for in Applicant’s independent claims 1, 13 and 30. Note that although the reference of Lizama et al. in column 5, lines 32-41 teaches a difference in the specific gravity between Lizama et al.’s aqueous phase and Lizama et al.’s organic phase, Lizama et al does not teach a specific gravity difference of as low as 0.01 between Lizama et al.’s aqueous phase and Lizama et al.’s organic phase.

**C. The reference of Lizama et al. does not teach a polar interaction**

Applicant’s independent claims 1 and 30 each also calls for the step of

“...allowing the plurality of extraction liquid droplets to form a polar interaction with the unwanted liquid in the fluid to cause the extraction liquid droplets to form into a plurality of microdispersed droplets containing the unwanted liquid...” (Emphasis added.)

Applicant’s independent claim 13 also calls for:

“...said polar liquid droplets attractable to the acid in the fluid through a polar interaction to form a plurality of polar liquid acid droplets;” (Emphasis added.)

The Applicant respectfully submits that the reference of Lizama et al. does not teach a polar interaction between Lizama et al.’s aqueous phase and the constituent located in Lizama et al.’s organic phase. The reference of Lizama et al. instead requires Lizama et al.’s aqueous phase and the constituent located in Lizama et al.’s organic phase to come into both “...

physical and chemical contact". (See for example column 4, lines 53-67 of Lizama et al.) In column 5, lines 17-18, Lizama et al. explains that the physical and chemical contact between Lizama et al.'s aqueous phase and the constituent located in Lizama et al.'s organic phase allows the biocatalyst in the Lizama et al.'s aqueous phase to react with the constituent located in Lizama et al.'s organic phase "... to chemically or physically convert it to a safer product."

The Applicant respectfully submit that a polar interaction between the Applicant's extraction liquid droplets and the unwanted liquid of Applicant's independent claims 1 and 30 and a polar interaction between the Applicant's polar liquid droplets attractable and the acid in the fluid of Applicant's independent claim 13 is different from the physical and chemical contact between Lizama et al.'s aqueous phase and the constituent located in Lizama et al.'s organic phase.

In view of the above, since the reference of Lizama et al. does not teach the formation of a polar interaction between Lizama et al.'s aqueous phase and the constituent located in Lizama et al.'s organic phase but instead requires the physical and chemical contact between Lizama et al.'s aqueous phase and the constituent located in Lizama et al.'s organic phase, the Applicant respectfully submits that Applicant's independent claims 1, 13 and 30 are allowable over the reference of Lizama et al.

**Rejection under 35 U.S.C. 103(a) to combination  
of the references of Lizama et al. and Bayley et al**

Applicant's claims 9-12, 16, 24-26 and 32 stand rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of the references of Lizama et al (US Patent No. 5,458,752) in view of Bayley et al (British Patent 1,443,704). In regards to Applicant's dependent claims 9-12, Applicant's dependent claims 9-12, by way of independent claim 1, each calls for a process for the extraction of an unwanted liquid from a fluid that includes the step of:

“...controlling a volume of the immiscible extraction liquid introduced into the fluid such that there is a specific gravity difference of as low as 0.01 between the larger droplets containing the unwanted liquid and the fluid;...” (Emphasis added.)

In regards to Applicant's dependent claims 16, 24-26, Applicant's dependent claims 16, 24-26, by way of independent claim 13, each calls for a process for the extraction of an acid from a fluid that includes the step of:

“...controlling an amount of water added to the fluid such that there is a specific gravity difference of as low as 0.01 between the plurality of larger droplets containing the acid and the fluid;...” (Emphasis added.)

In regards to Applicant's dependent claim 32, Applicant's dependent claims 32, by way of independent claim 30, calls for a process for the extraction of an unwanted liquid from a fluid that includes the step of:

“...controlling an amount of immiscible extraction liquid introduced into the fluid such that there is a specific gravity difference of as low as 0.01 between the larger droplets and the fluid;...”(Emphasis added.)



The Applicant respectfully submits that the combination of the references of Lizama et al and Bayley et al. does not teach the feature of providing a specific gravity difference of as low as 0.01 between the larger droplets and the fluid as called for in Applicant's dependent claims 9-12, 16, 24-26 and 32. More specifically, in regards to the reference of Lizama et al., it is noted that although the reference of Lizama et al. in column 5, lines 32-41 teaches a difference in the specific gravity between Lizama et al.'s aqueous phase and Lizama et al.'s organic phase, Lizama et al does not teach a specific gravity difference of as low as 0.01 between Lizama et al.'s aqueous phase and Lizama et al.'s organic phase. In regards to the reference of Bayley et al., it is submitted that a review of the reference of Bayley et al failed to reveal the teaching of a specific gravity difference of as low as 0.01 between the larger droplets and the fluid as called for in Applicant's dependent claims 9-12, 16, 24-26 and 32.

In view of the above, since the references of Lizama et al. and Bayley et al. each does not teach the feature of providing a specific gravity difference of as low as 0.01 between the larger droplets and the fluid as called for in Applicant's dependent claims 9-12, 16, 24-26 and 32, the Applicant respectfully submits that the combination of the references of Lizama et al. and Bayley et al. also does not teach the aforementioned feature of Applicant's dependent claims 9-12, 16, 24-26 and 32.

In further regards to Applicant's claims 9-12, 16, 24-26 and 32, Applicant's dependent claims 9-12 and 32 by way of independent claims 1 and 30, each calls for each also calls for the step of:



“...allowing the plurality of extraction liquid droplets to form a polar interaction with the unwanted liquid in the fluid to cause the extraction liquid droplets to form into a plurality of microdispersed droplets containing the unwanted liquid...” (Emphasis added.)

Applicant’s dependent claims 16, 24-26, by way of independent claim 13, each calls for:

“...said polar liquid droplets attractable to the acid in the fluid through a polar interaction to form a plurality of polar liquid acid droplets;” (Emphasis added.)

The Applicant respectfully submits that the combination of the references of Lizama et al. and of Bayley et al. does not teach the above. In regards to the reference of Lizama et al., the Applicant respectfully submits that Lizama et al. does not teach a polar interaction between Lizama et al.’s aqueous phase and the constituent located in Lizama et al.’s organic phase. The reference of Lizama et al. instead requires Lizama et al.’s aqueous phase and the constituent located in Lizama et al.’s organic phase to come into both “... physical and chemical contact”. (See for example column 4, lines 53-67 of Lizama et al.) In column 5, lines 17-18, Lizama et al. explains that the physical and chemical contact between Lizama et al.’s aqueous phase and the constituent located in Lizama et al.’s organic phase allows the biocatalyst in the Lizama et al.’s aqueous phase to react with the constituent located in Lizama et al.’s organic phase “... to chemically or physically convert it to a safer product.”

The Applicant respectfully submit that a polar interaction between the Applicant’s extraction liquid droplets and the unwanted liquid of Applicant’s independent claims 1 and 30 and a polar interaction between the Applicant’s polar liquid droplets attractable and the acid in the fluid of Applicant’s independent claim 13 is different from the physical and chemical contact

between Lizama et al.'s aqueous phase and the constituent located in Lizama et al.'s organic phase.

In regards to the reference of Bayley et al., the Applicant respectfully submits that the reference of Bayley et al. also does not teach the formation of a polar interaction between droplets of Bayley et al.'s solvent and the liquid to be recovered in the liquid/liquid mixture. Bayley et al. instead requires Bayley et al.'s solvent and the liquid to be recovered in the liquid/liquid mixture to come into intimately contact and form a two-phase dispersion with the remaining liquid of the liquid/liquid mixture. (See for example page 1, lines 10-24 and page 3, lines 47-70 of Bayley et al.) Note in page 4, lines 41-46 wherein Bayley et al. teaches that if contact between Bayley et al.'s solvent and the liquid to be recovered in the liquid/liquid mixture is not completed in the mixing chamber, the contact between Bayley et al.'s solvent and the liquid to be recovered in the liquid/liquid mixture "... can also continue in the packing itself." It is respectfully noted that the stream from which Bayley et al.'s liquid is to be recovered is itself a liquid/liquid dispersion, whereas in the present invention, there is no dispersion prior to the introduction of the extracting fluid. The Applicant respectfully submit that a polar interaction between the Applicant's extraction liquid droplets and the unwanted liquid of Applicant's dependent claims 9-12, 16, 24-26 and 32 is different from an intimate contact between Bayley et al.'s solvent and the liquid to be recovered in Bayley et al.'s liquid/liquid mixture.

In view of the above, since the references of Lizama et al. and Bayley et al. each does not teach the formation of a polar interaction as called for in Applicant's dependent claims 9-12,

16, 24-26 and 32, the Applicant respectfully submits that the combination of the references of Lizama et al. and Bayley et al. also does not teach the aforementioned feature of Applicant's dependent claims 9-12, 16, 24-26 and 32.

It is for the above reasons that the Applicant respectfully submits that Applicant's dependent claims 9-12, 16, 24-26 and 32 are allowable over the combination of the references of Lizama et al. and Bayley et al.

In further regards to Applicant's claims 2-6, 8, 9-12, 14-17, 27, 29, and 32, Applicant's dependent claims 2-6, 8 and 9-12 each depends on Applicant's independent claim 1 and Applicant's dependent claim 14-17, 19-20, and 22-27 each depends on Applicant's independent claim 13. Since Applicant's independent claim 1 and Applicant's independent claim 13, as amended, are allowable for the reasons given above, Applicant's dependent claims 2-6, 8-12 and 14-17, 19-20, and 22-27 should also be allowable. Applicant's dependent claim 32 depends on Applicant's independent claim 30. Since Applicant's independent claims 28 and 30, as amended, are allowable for the reasons given above, Applicant's dependent claim 29 and 32 should also be allowable.

In view of the above, it is submitted that the application is in condition for allowance.

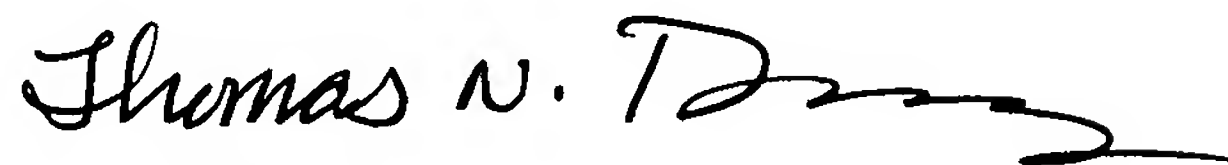
Allowance of claims 1-6, 8-17, 19-20, 22-10, and 32-34, as amended, is respectfully requested. Applicant has enclosed a version of the amendment showing changes made with this response.

A response to the Office Action for the present case was due on May 23, 2007. The Applicant hereby petitions for a one-month time extension up to and including the date of June 23, 2007 to file the response. The Applicant has enclosed a petition form PTO/SB/22 form and a credit card authorization form in the amount of \$120.00 for payment of the time extension fee. Please charge any additional fees that may be due to Deposit Account 10-0210.

Respectfully submitted,

**JACOBSON AND JOHNSON**

By



Thomas N. Phung, Reg. No. 53,466  
Attorneys for Applicant  
Suite 285  
One West Water Street  
St. Paul, Minnesota 55107-2080  
Telephone: 651- 222-3775  
Fax: 651-222-3776

TNP/tp  
Enclosure